OM-1556 115 038B

June 1998

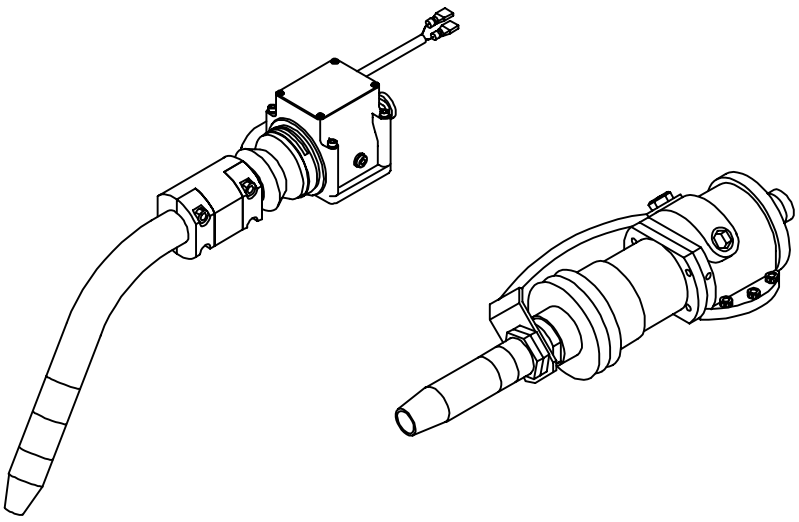
Processes

Automatic Welding

Description

Welding Gun

MTXC 3501M And MTX 3502 Robot Guns



OWNER'S MANUAL

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www.MillerWelds.com

From Miller to You

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That's why when Niels Miller first started building arc welders in 1929, he made sure his products offered long-lasting value and superior quality. Like you, his customers couldn't afford anything less. Miller products had to be more than the best they could be. They had to be the best you could buy.

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This Owner's Manual is designed to help you get the most out of your Miller products. Please take time to read the Safety precautions. They will help you protect yourself against potential hazards on the worksite. We've made installation and operation quick and easy. With Miller you can count on years of reliable service with proper maintenance. And if for some reason the unit needs repair, there's a Troubleshooting section that will help you figure out what the problem is. The parts list will then help you to decide which exact part you may need to fix the problem. Warranty and service information for your particular model are also provided.

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SECTION 1 – SAFETY PRECAUTIONS - READ BEFORE USING

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1-1. Symbol Usage

Means Warning! Watch Out! There are possible hazards with this procedure! The possible hazards are shown in the adjoining symbols.

▲ **Marks a special safety message.**

☞ *Means "Note"; not safety related.*

This group of symbols means Warning! Watch Out! possible ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.

1-2. Arc Welding Hazards

▲ **The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1-4. Read and follow all Safety Standards.**

▲ **Only qualified persons should install, operate, maintain, and repair this unit.**

▲ **During operation, keep everybody, especially children, away.**

ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not use AC output in damp areas, if movement is confined, or if there is a danger of falling.
- Use AC output ONLY if required for the welding process.
- If AC output is required, use remote output control if present on unit.
- Disconnect input power or stop engine before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
- Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
- Always verify the supply ground – check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet.
- When making input connections, attach proper grounding conductor first – double-check connections.
- Frequently inspect input power cord for damage or bare wiring – replace cord immediately if damaged – bare wiring can kill.
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or poorly spliced cables.
- Do not drape cables over your body.
- If earth grounding of the workpiece is required, ground it directly with a separate cable – do not use work clamp or work cable.
- Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.
- Do not connect more than one electrode or work cable to any single weld output terminal.

SIGNIFICANT DC VOLTAGE exists after removal of input power on inverters.

- Turn Off inverter, disconnect input power, and discharge input capacitors according to instructions in Maintenance Section before touching any parts.

FUMES AND GASES can be hazardous.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
- If ventilation is poor, use an approved air-supplied respirator.
- Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for metals, consumables, coatings, cleaners, and degreasers.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watch-person nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.

ARC RAYS can burn eyes and skin.

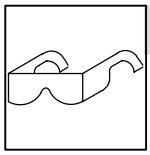
Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.

- Wear a welding helmet fitted with a proper shade of filter to protect your face and eyes when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
- Wear protective clothing made from durable, flame-resistant material (leather and wool) and foot protection.

WELDING can cause fire or explosion.

Welding on closed containers, such as tanks, drums, or pipes, can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating, or fire. Check and be sure the area is safe before doing any welding.

- Protect yourself and others from flying sparks and hot metal.
- Do not weld where flying sparks can strike flammable material.
- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not weld on closed containers such as tanks, drums, or pipes, unless they are properly prepared according to AWS F4.1 (see Safety Standards).
- Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
- Do not use welder to thaw frozen pipes.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
- Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.



FLYING METAL can injure eyes.

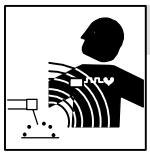
- Welding, chipping, wire brushing, and grinding cause sparks and flying metal. As welds cool, they can throw off slag.
- Wear approved safety glasses with side shields even under your welding helmet.

BUILDUP OF GAS can injure or kill.

- Shut off shielding gas supply when not in use.
- Always ventilate confined spaces or use approved air-supplied respirator.

HOT PARTS can cause severe burns.

- Do not touch hot parts bare handed.
- Allow cooling period before working on gun or torch.



MAGNETIC FIELDS can affect pacemakers.

- Pacemaker wearers keep away.
- Wearers should consult their doctor before going near arc welding, gouging, or spot welding operations.

NOISE can damage hearing.

Noise from some processes or equipment can damage hearing.

- Wear approved ear protection if noise level is high.

CYLINDERS can explode if damaged.

Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

- Protect compressed gas cylinders from excessive heat, mechanical shocks, slag, open flames, sparks, and arcs.
- Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping.
- Keep cylinders away from any welding or other electrical circuits.
- Never drape a welding torch over a gas cylinder.
- Never allow a welding electrode to touch any cylinder.
- Never weld on a pressurized cylinder – explosion will result.
- Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.

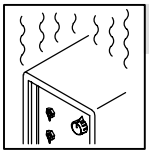
1-3. Additional Symbols For Installation, Operation, And Maintenance

FIRE OR EXPLOSION hazard.

- Do not install or place unit on, over, or near combustible surfaces.
- Do not install unit near flammables.
- Do not overload building wiring – be sure power supply system is properly sized, rated, and protected to handle this unit.

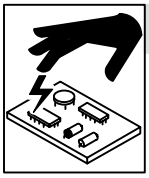
FALLING UNIT can cause injury.

- Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.
- Use equipment of adequate capacity to lift and support unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.



OVERUSE can cause OVERHEATING

- Allow cooling period; follow rated duty cycle.
- Reduce current or reduce duty cycle before starting to weld again.
- Do not block or filter airflow to unit.



STATIC (ESD) can damage PC boards.

- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.

MOVING PARTS can cause injury.

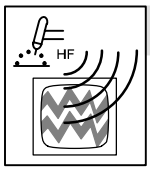
- Keep away from moving parts.
- Keep away from pinch points such as drive rolls.

WELDING WIRE can cause injury.

- Do not press gun trigger until instructed to do so.
- Do not point gun toward any part of the body, other people, or any metal when threading welding wire.

MOVING PARTS can cause injury.

- Keep away from moving parts such as fans.
- Keep all doors, panels, covers, and guards closed and securely in place.



H.F. RADIATION can cause interference.

- High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.

ARC WELDING can cause interference.

- Electromagnetic energy can interfere with sensitive electronic equipment such as computers and computer-driven equipment such as robots.
- Be sure all equipment in the welding area is electromagnetically compatible.
- To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor.
- Locate welding operation 100 meters from any sensitive electronic equipment.
- Be sure this welding machine is installed and grounded according to this manual.
- If interference still occurs, the user must take extra measures such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.

1-4. Principal Safety Standards

Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami FL 33126

Safety and Health Standards, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

Safe Practices For Occupation And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting And Welding Processes, NFPA Standard 51B, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

1-5. EMF Information

Considerations About Welding And The Effects Of Low Frequency Electric And Magnetic Fields

Welding current, as it flows through welding cables, will cause electromagnetic fields. There has been and still is some concern about such fields. However, after examining more than 500 studies spanning 17 years of research, a special blue ribbon committee of the National Research Council concluded that: “The body of evidence, in the committee’s judgment, has not demonstrated that exposure to power-frequency electric and magnetic fields is a human-health hazard.” However, studies are still going forth and evidence continues to be examined. Until the final conclusions of the research are reached, you may wish to minimize your exposure to electromagnetic fields when welding or cutting.

To reduce magnetic fields in the workplace, use the following procedures:

1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep welding power source and cables as far away from operator as practical.
5. Connect work clamp to workpiece as close to the weld as possible.

About Pacemakers:

Pacemaker wearers consult your doctor first. If cleared by your doctor, then following the above procedures is recommended.

SECTION 2 – SPECIFICATIONS

2-1. Specifications

Specifications	Description
Rated Output	350 Amperes Using CO_2 Shielding Gas
Duty Cycle	50%
Cooling Method	Air
Wire Diameter	.030 Thru 1/16 in (0.8 Thru 1.6 mm) Hard, Flux Cored, Or Aluminum Wire
Weight	MTX 3502: Net: 2.3 lb (1 kg) Ship: 3.2 lb (1.5 kg) MTXC 3501M: Net: 2.6 lb (1.2 kg) Ship: 3.5 lb (1.6 kg)

2-2. Duty Cycle

⚠ CAUTION

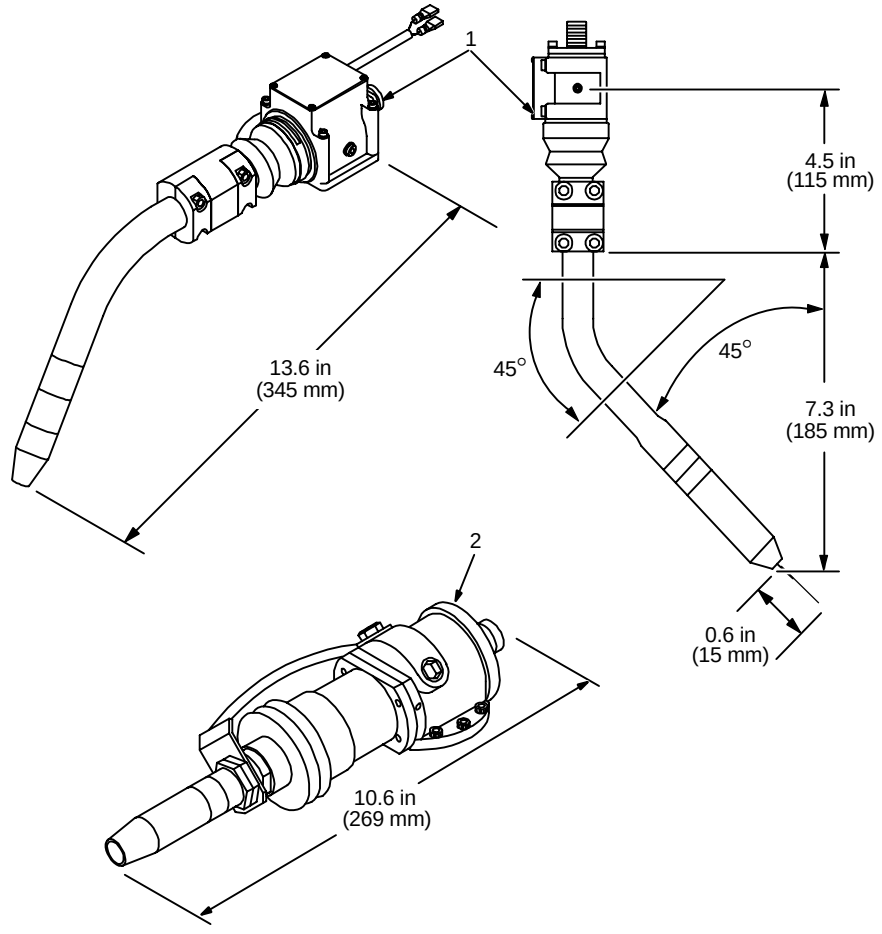
USING GUN ABOVE DUTY CYCLE RATING can damage gun.

- Do not use gun above rated amperage when using CO_2 shielding gas.

Rated output of the gun drops when using mixed gases.

Duty cycle is the percentage of a ten minute period that the gun can be operated at rated output using CO_2 shielding gas without causing damage or overheating. These welding gun models are rated at 50% duty cycle allowing welding for 5 minutes out of every 10 minutes.

2-3. Welding Gun Dimensions



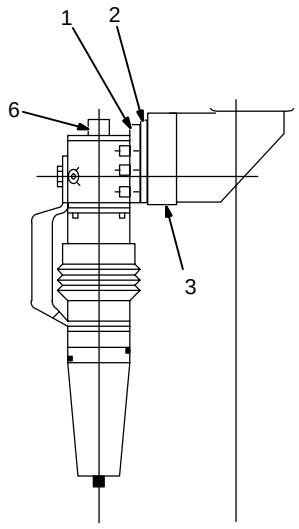
1 MTXC 3501M Welding Gun

2 MTX 3502 Welding Gun

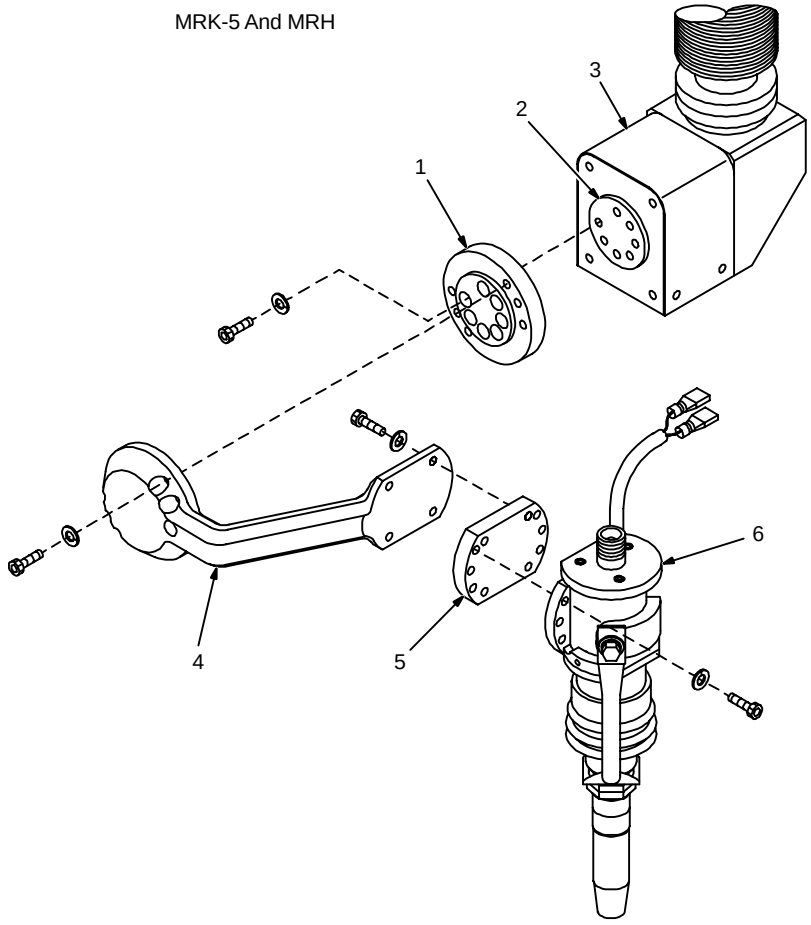
ST-135 144-A / ST-154 518 / ST-114 276-A

SECTION 3 – INSTALLING THE GUN

3-1. MTX 3502 Gun Installation



MRK-5 And MRH



MR-5

▲ **Turn Off welding power source and Robot Control, and disconnect input power before inspecting or installing.**

1 Mounting Plate

2 Axis 5 (Phi Axis) Output Hub

3 Axis 5 (Phi Axis)

For MRK-5 and MRH robot models, install gun to mounting plate on Axis 5 (Phi Axis) output hub using supplied socket-head screws.

4 30° Mounting Bracket

5 Insulating Plate

For MR-5 robot model, install 30° mounting bracket to mounting plate on Axis 5 (Phi Axis) output hub using supplied socket-head screws.

Install gun to insulating plate on 30° mounting bracket using supplied socket-head screws.

6 Adapter

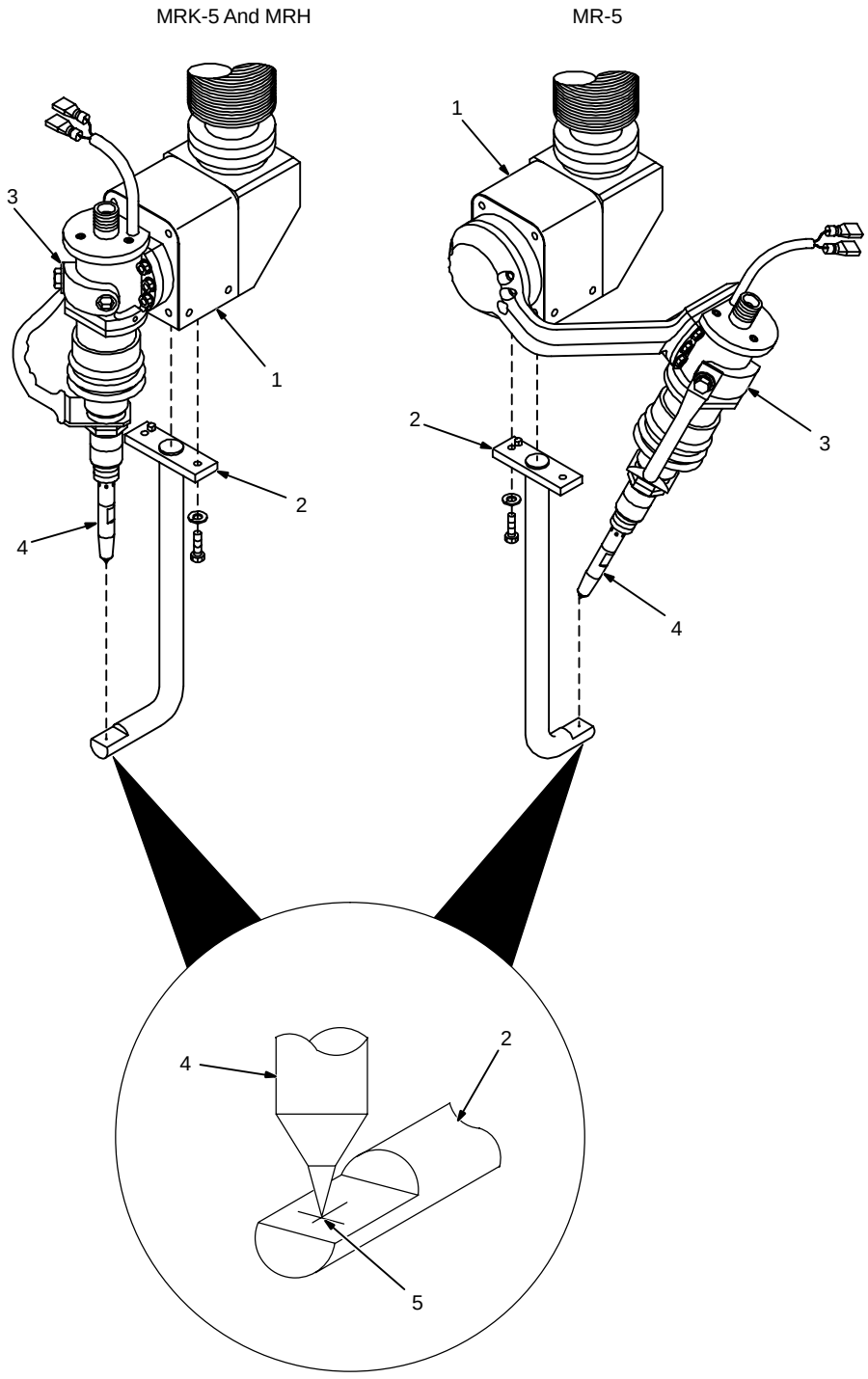
Connect outlet cable to adapter by tightening outlet cable nut onto adapter.

Tighten jam nut against outlet cable nut.

Connect shock sensor leads from gun to outlet cable leads and connect leads at opposite end of outlet cable to leads or matching connector at manipulator. Polarity is not important.

S-0519 / ST-800 238

3-2. Positioning Gauge (J-Bar) Installation And Gun Alignment



1 Axis 5 (Phi Axis)

2 Positioning Gauge (J-Bar)

Remove cover plate from base of Axis 5 (Phi Axis) housing and install J-bar using supplied screws.

3 Welding Gun

4 Tip Gauge

Remove nozzle and contact tip from welding gun and install tip gauge where contact tip was removed.

5 Reference Mark

Loosen screws securing welding gun or mounting bracket to gun mounting plate and align tip gauge with reference mark in J-bar. Tighten screws after adjustment.

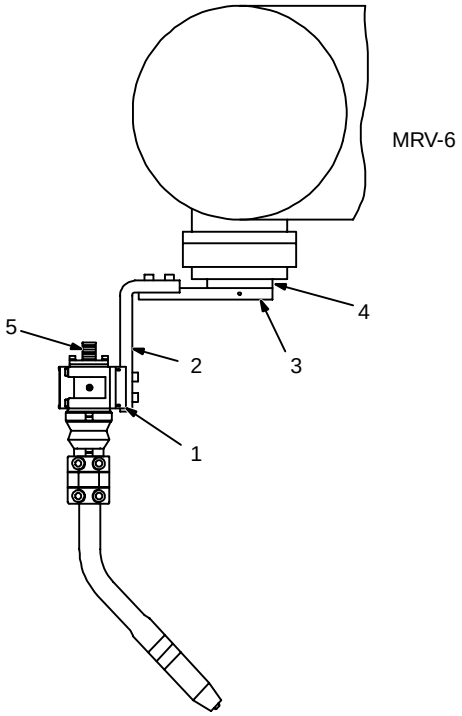
To move gun forward or back, add or remove shims from between mounting plate and gun or 30° mounting bracket.

Remove J-bar, and reinstall cover plate onto base of Axis 5 (Phi Axis).

Remove tip gauge, and reinstall contact tip and nozzle.

ST-800 239 / S-0241

3-3. MTXC 3501M Gun Installation



1 Insulator

Install insulator to gun using supplied flat washers, lock washers, and socket-head screws.

2 90° Mounting Bracket

Install 90° mounting bracket to insulator using supplied socket-head screws.

3 Output Hub Bracket

4 Axis 6

Install 90° mounting bracket to output hub bracket on Axis 6 using supplied socket-head screws.

5 Adapter

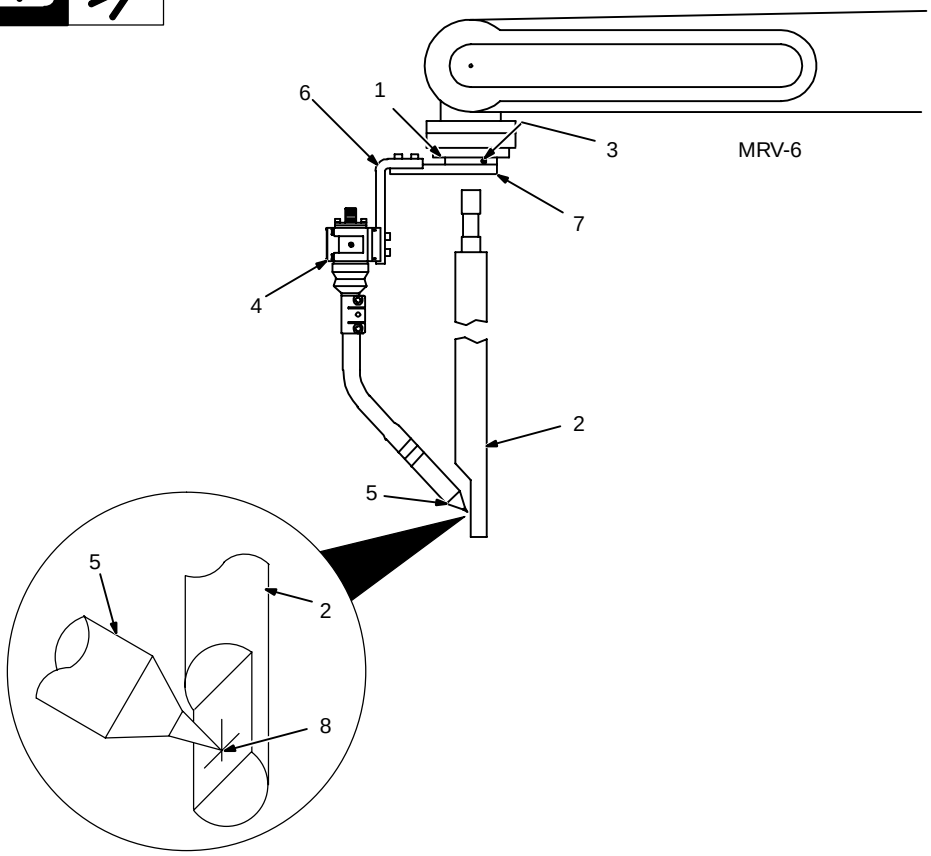
Connect outlet cable to adapter by tightening outlet cable nut onto adapter.

Tighten jam nut against outlet cable nut.

Connect shock sensor leads from gun to outlet cable leads and connect leads at opposite end of outlet cable to leads or matching connector at manipulator. Polarity is not important.

ST-135 146-A

3-4. Positioning Gauge (I-Bar) Installation And Gun Alignment



1 Axis 6

2 Positioning Gauge (I-Bar)

3 Setscrew

Loosen setscrew in Axis 6 output hub, install I-bar into hub, and tighten setscrew.

4 Welding Gun

5 Tip Gauge

Remove nozzle and contact tip from welding gun and install tip gauge where contact tip was removed.

6 90° Mounting Bracket

7 Output Hub Bracket

8 Reference Mark

To move welding gun forward or back, loosen screws securing 90° mounting bracket to output hub bracket and align tip gauge with reference mark in I-bar. Tighten screws after adjustment.

To move welding gun up or down, loosen screws securing insulator to 90° mounting bracket and align tip gauge with reference mark in I-bar. Tighten screws after adjustment.

To move welding gun left or right, loosen screws securing gun to insulator and align tip gauge with reference mark in I-bar. Tighten screws after adjustment.

Remove I-bar, and tighten setscrew.

Remove tip gauge, and reinstall contact tip and nozzle.

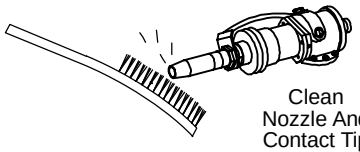
Ref. ST-136 148-A / Ref. S-0241

SECTION 4 – MAINTENANCE

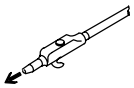
4-1. Routine Maintenance

Turn Off all power before maintaining.

Each Spool Of Wire

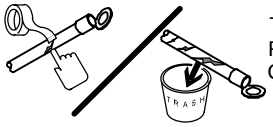


Clean Nozzle And Contact Tip



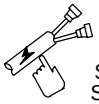
Blow Out Outlet Cable

3 Months



Tape Or Replace Cracked Weld Cable

Replace Cracked Parts

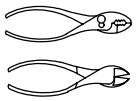


Shock Sensor Cord

Gas Hose

4-2. Replacing Gun Contact Tip

Tools Needed:



Turn Off welding power source and Robot Control.

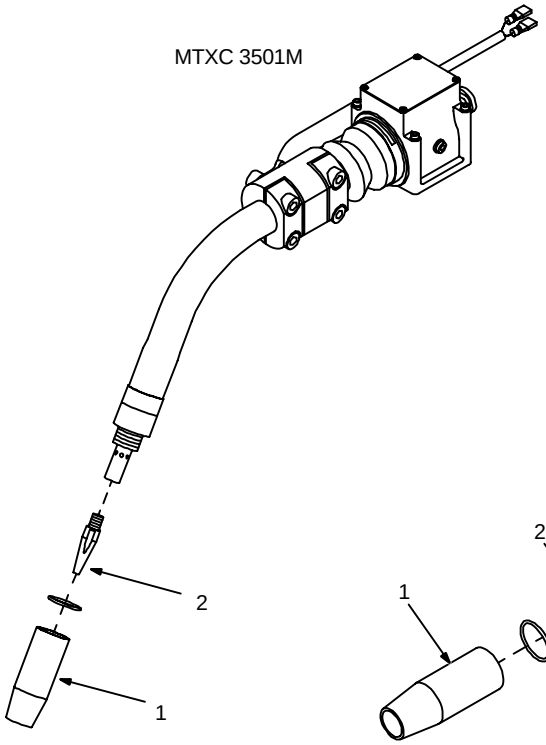
1 Nozzle

Cut off welding wire at contact tip. Remove nozzle.

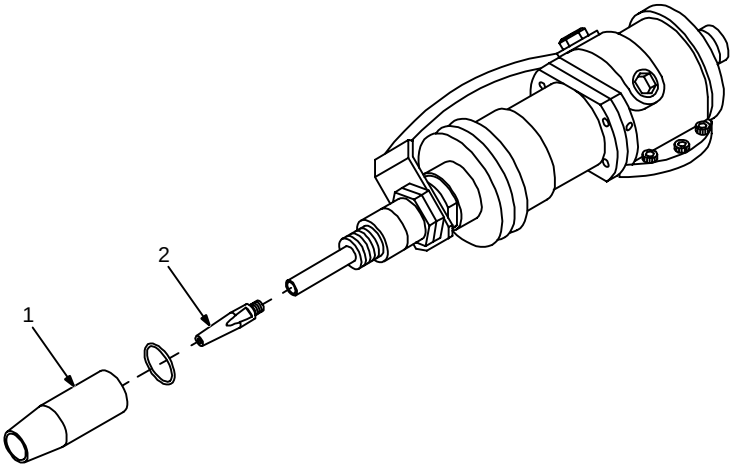
2 Contact Tip

Remove contact tip and install new contact tip. Reinstall nozzle.

MTXC 3501M



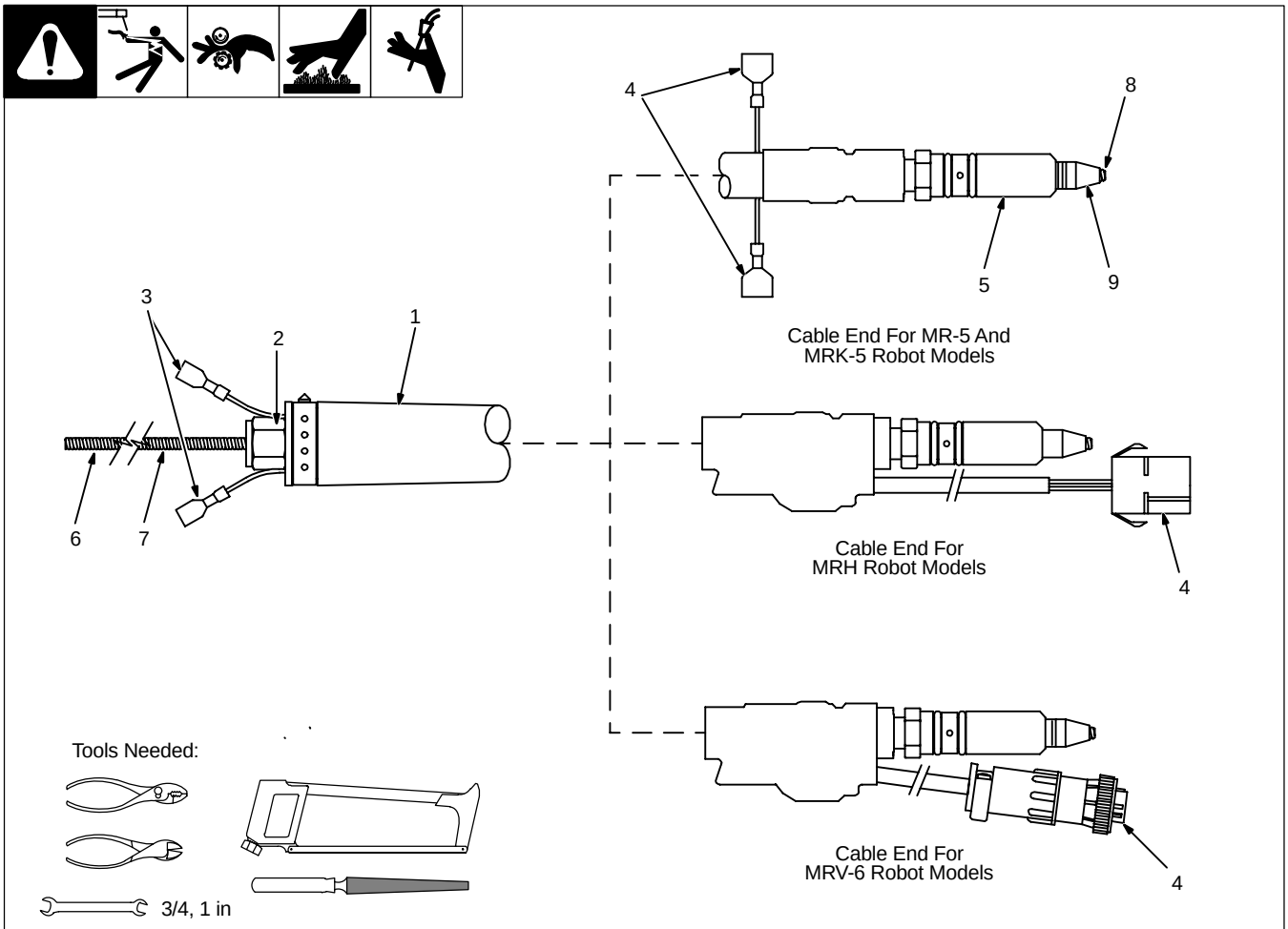
MTX 3502



ST-800 237

4-3. Outlet Cable Preparation For Changing Wire Size

NOTE ☞ *When changing wire size, it is necessary to change the wire drive rolls and wire guides on the wire drive assembly, the outlet cable and monocoil liner, and the gun contact tip.*



ST-152 515

Turn Off welding power source and Robot Control.

Cut off welding wire at gun contact tip, and retract wire back to spool.

1 Outlet Cable

2 Output Cable Nut

3 Shock Sensor Leads Gun End

Disconnect shock sensor leads, loosen jam nut and outlet cable nut, and remove outlet cable from adapter on gun (see Section 3-1 and Section 3-3).

4 Shock Sensor Connector(s)

5 Cable Connector

Disconnect shock sensor connector(s), loosen securing knob, and remove cable connector from wire drive assembly.

Remove existing outlet cable from supports on robot.

Secure new wire size outlet cable to supports on robot.

Install and secure cable connector into wire drive assembly (see Motor/Drive Assembly Owner's Manual).

6 Monocoil Liner (Excess Portion)

7 Monocoil Liner (Gun Portion)

8 Monocoil Liner Drive Roll End

9 Wire Outlet Guide

Insert excess portion of liner fully into gun, be sure liner is seated at wire outlet guide, and mark liner flush with top of adapter.

Slide liner out of adapter, be sure liner is seated at wire outlet guide, and measure distance between mark and end of nut on cable.

Use previous measurement to measure length at excess portion of liner, cut off liner, and deburr cut end of liner at cable.

Insert liner into adapter and connect outlet cable to adapter by tightening cable nut onto adapter.

Tighten jam nut against outlet cable nut.

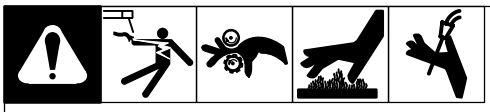
Connect shock sensor leads from gun to outlet cable leads and connect leads at opposite end of outlet cable to leads or matching connector at robot. Polarity is not important.

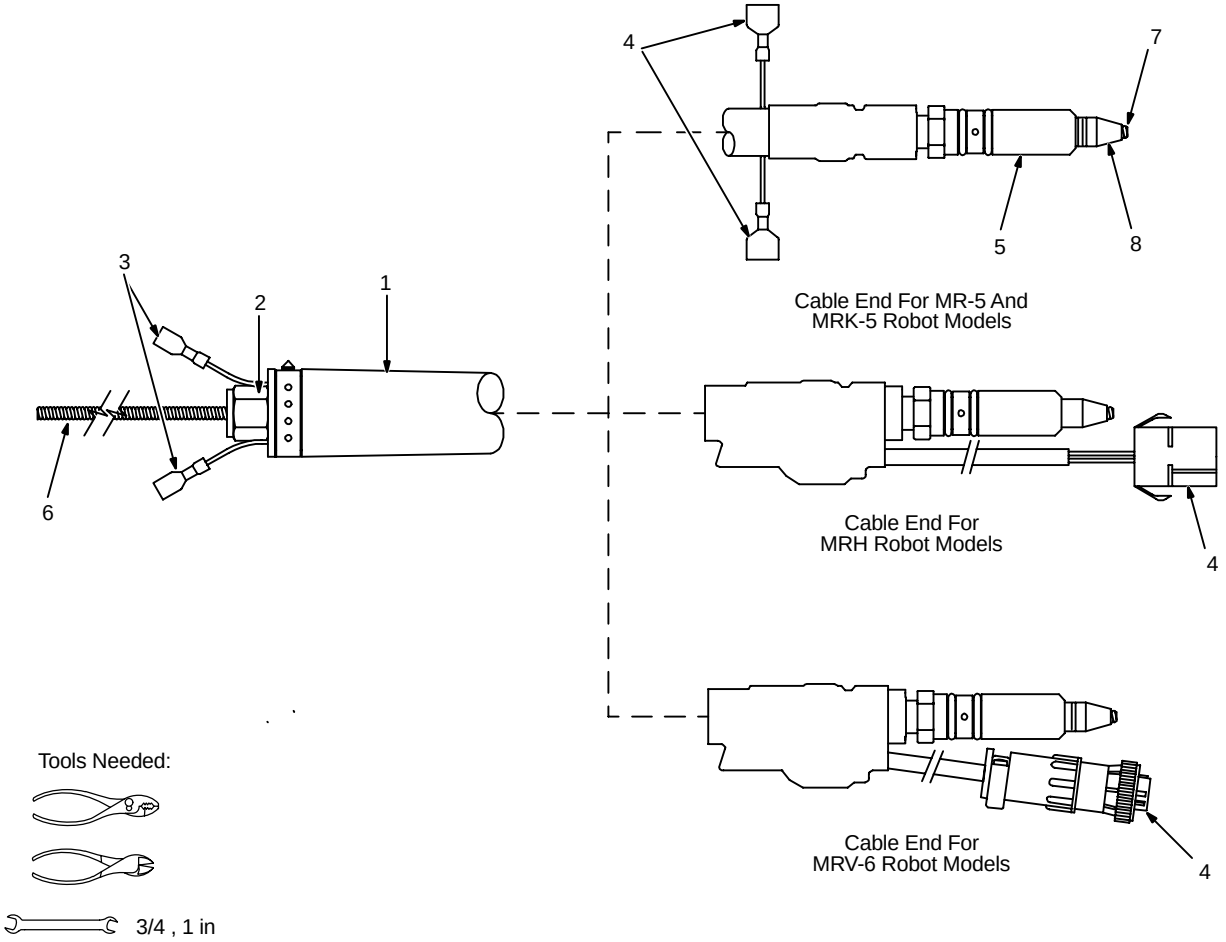
Change gun contact tip (see Section 4-2).

Change wire guides and drive rolls at drive assembly (see Motor/Drive Assembly Owner's Manual).

Thread welding wire and set drive roll pressure (see Robot Owner's Manual and Motor/Drive Assembly Owner's Manual).

4-4. Cleaning Or Replacing Liner





ST-152 515

Turn Off welding power source and Robot Control.

Cut off welding wire at gun contact tip, and retract wire to wire drive assembly.

1 Outlet Cable

2 Outlet Cable Nut

3 Shock Sensor Leads Gun End

Disconnect shock sensor leads, loosen jam nut and outlet cable nut, and remove outlet cable from adapter on gun (see Section 3-1 and Section 3-3).

4 Shock Sensor Connector(s)

5 Cable Connector

Disconnect shock sensor connector(s), loosen securing knob, and remove cable connector from wire drive assembly.

Remove outlet cable from supports on robot.

6 Monocoil Liner (Gun Portion)

7 Monocoil Liner Drive Roll End

8 Wire Outlet Guide

Remove wire outlet guide, and pull liner from this end.

Blow cable out with compressed air.

Install liner into cable, and reinstall wire outlet guide.

Secure outlet cable to supports on robot.

If replacing monocoil, follow the procedure for cutting liner to size according to Section 4-3.

Insert liner into adapter and connect outlet cable to adapter by tightening cable nut onto adapter.

Tighten jam nut against outlet cable nut.

Install and secure cable connector into wire drive assembly (see Motor/Drive Assembly Owner's Manual).

Connect shock sensor leads from gun to outlet cable leads and connect connector(s) at opposite end of outlet cable to matching connector(s) at robot. Polarity is not important.

Thread welding wire and set drive roll pressure (see robot Owner's Manual and Motor/Drive Assembly Owner's manual).

SECTION 5 – PARTS LIST

☞ *Hardware is common and not available unless listed.*

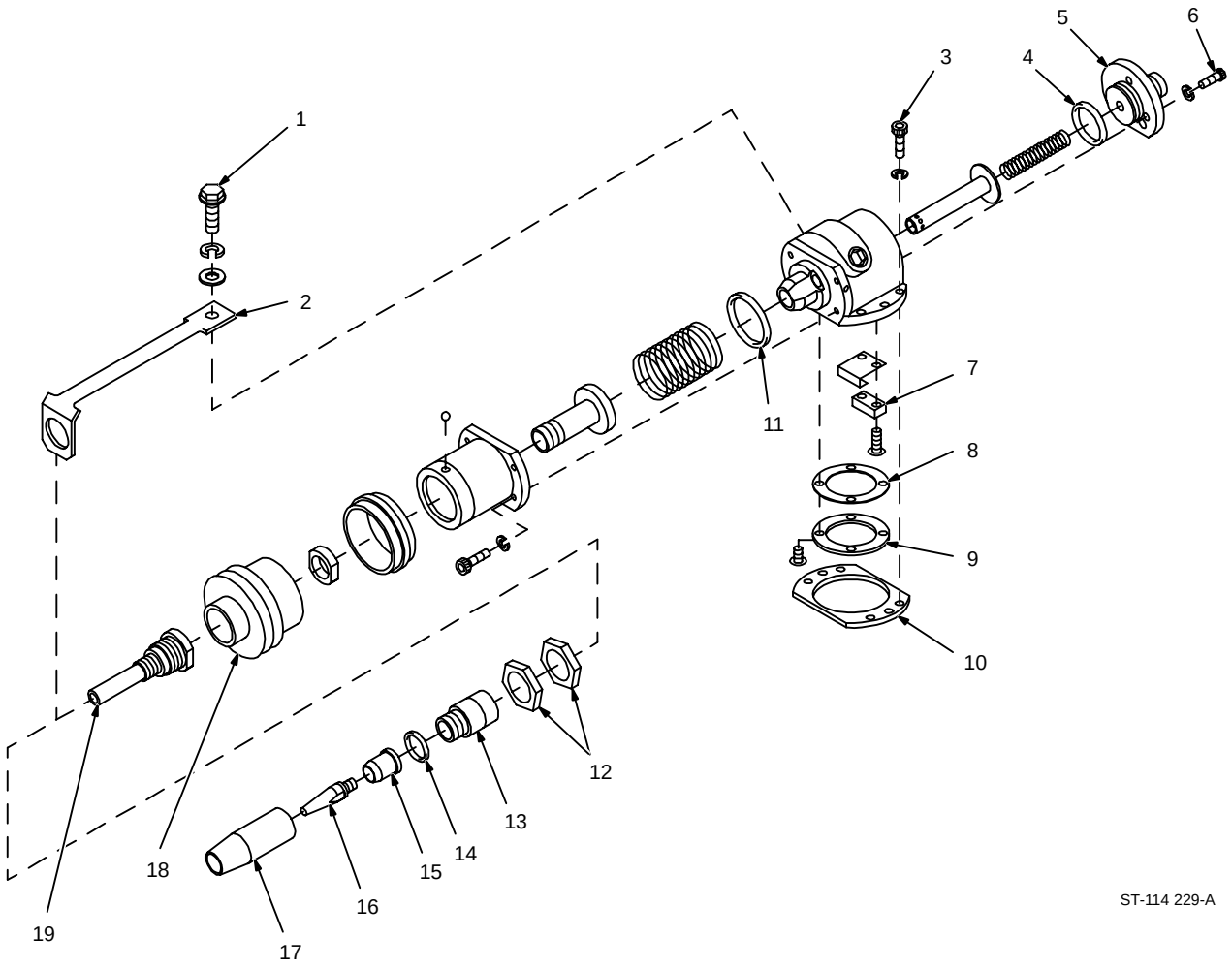


Figure 5-1. MTX 3502 Air Cooled Gun

Item No.	Part No.	Description	Quantity
	113 883	**Figure 5-1. MTX 3502 Air Cooled Gun**	
1	049 024	SCREW, M8-1.2 x 16 hexhd	1
2	114 251	POWER SUPPLY WIRE, (consisting of)	1
	108 770	PROTECTION TUBE	1
3	108 693	SCREW, M5-.8 x 14 soc hd hex	6
4	108 780	0-RING (S-25)	1
5	114 249	ADAPTER, brs	1
6	158 952	SCREW, M4-.7 x 12 soc hd hex	4
7	108 772	MICROSWITCH	1
8	108 773	PACKING	1
9	108 774	SWITCH COVER	1
10	108 775	SHIM	1
11	108 779	O-RING (S-32)	1
12	108 767	NUT	2
13	108 776	INSULATION, bush	1
14	108 778	O-RING (P12)	1
15	108 777	INSULATOR, cer	1
16	108 789	CONTACT TIP (Q0.9)	1
16	♦108 788	CONTACT TIP (Q0.8)	1
16	♦108 786	CONTACT TIP (Q1.2)	1
16	♦108 790	CONTACT TIP (Q1.6)	1
16	♦129 886	CONTACT TIP, .023 wire	1
17	108 784	NOZZLE (No. 8)	1
17	♦110 854	NOZZLE (No. 7 short)	1
17	♦108 793	NOZZLE (No. 8 long)	1
17	♦108 785	NOZZLE (No. 10)	1
17	♦112 471	NOZZLE (No. 6 short)	1
17	♦112 470	NOZZLE (No. 6 long)	1
17	♦112 469	NOZZLE (No. 7 long)	1
17	♦112 468	NOZZLE (fine)	1
18	108 766	BOOT, rbbr	1
19	108 768	ADAPTER, tip	1

♦Optional Equipment

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

Item No.	Part No.	Description	Quantity
	143 697	**Figure 5-2. MTXC 3501M Air Cooled Gun**	
1	133 992	WIRE ASSEMBLY, pwr supply	1
2	135 496	O-RING	1
3	150 795	KIT, hood replacement (consisting of)	1
4	143 695	CLAMP, band	1
5	133 995	HOOD	1
6	143 694	CLAMP, band	1
7	143 693	NOZZLE HOLDER ASSEMBLY	1
8	143 696	O-RING	1
9	143 692	NOZZLE ASSEMBLY	1
10	133 996	TIP BODY	1
11	108 789	CONTACT TIP, (Q0.9)	1
11	♦108 788	CONTACT TIP, (Q0.8)	1
11	♦108 792	CONTACT TIP, (Q1.0)	1
11	♦108 786	CONTACT TIP, (Q1.2)	1
11	♦113 954	CONTACT TIP, .045 wire	1
11	♦108 790	CONTACT TIP, (Q1.6)	1
12	108 776	INSULATION BUSHING	1
13	108 778	O-RING, (P12)	1
14	108 777	INSULATOR, cer	1
15	108 784	NOZZLE, (No 8)	1
15	♦110 854	NOZZLE, (No 7 short)	1
15	♦108 793	NOZZLE, (No 8 long)	1
15	♦108 785	NOZZLE, (No 10)	1

☞ *Hardware is common and not available unless listed.*

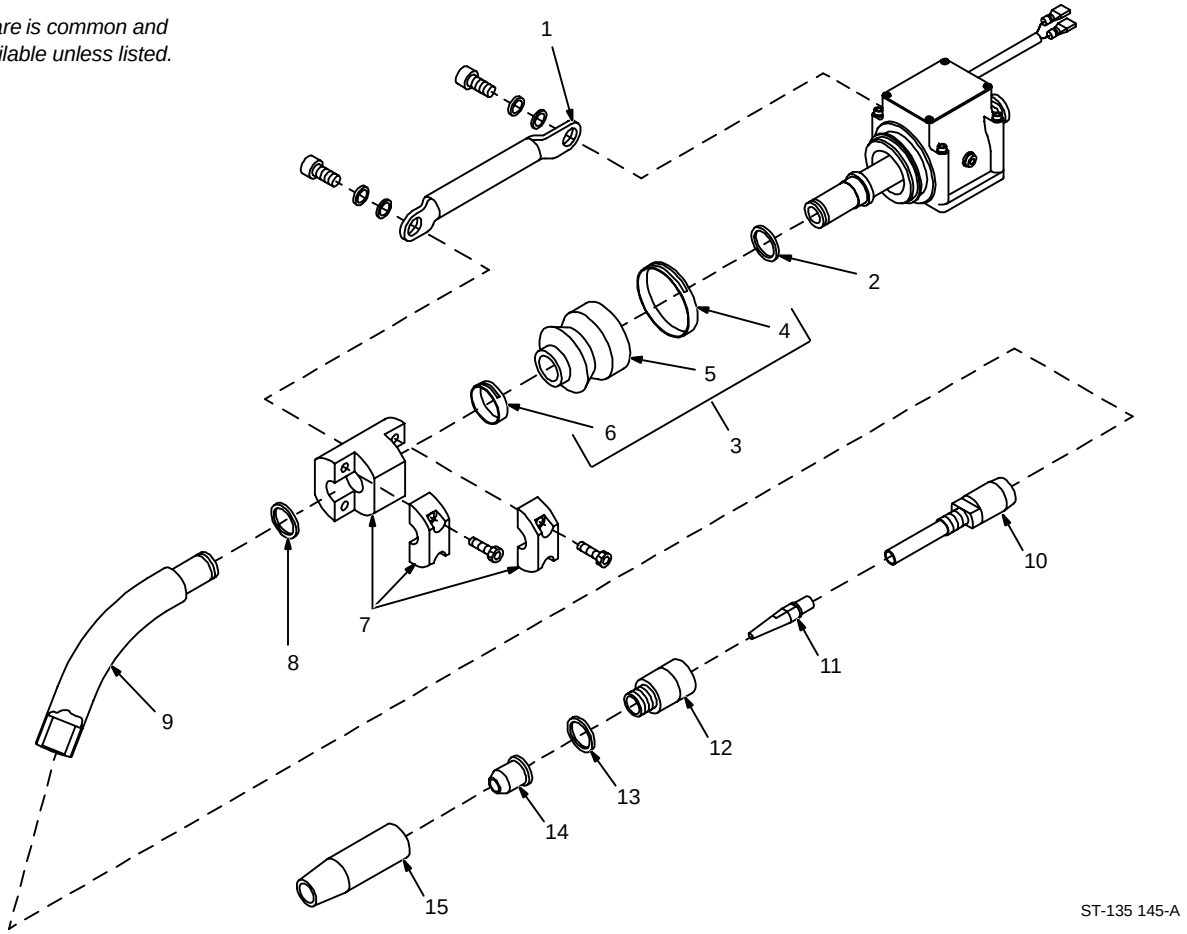


Figure 5-2. MTXC 3501M Air Cooled Gun

♦Optional Equipment

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

Item No.	Part No.	Description	Quantity

Figure 5-3 Torch Mtg Assembly (Style 1)

1	135 088	BRACKET	1
2	135 089	L-BRACKET	1
3	135 090	INSULATING BRACKET	1
4	136 047	HEXAGON SOCKET SET SCREW, M5 x 10	1
5	108 532	HEXAGON SOCKET HEAD BOLT M6 x 25	4
6	129 000	HEXAGON SOCKET HEAD BOLT, M4 x 15	1
7	105 934	HEXAGON SOCKET HEAD BOLT, M6 x 20	8
8	129 022	GT WASHER	8
	136 075	TORCH GAUGE, I bar	1

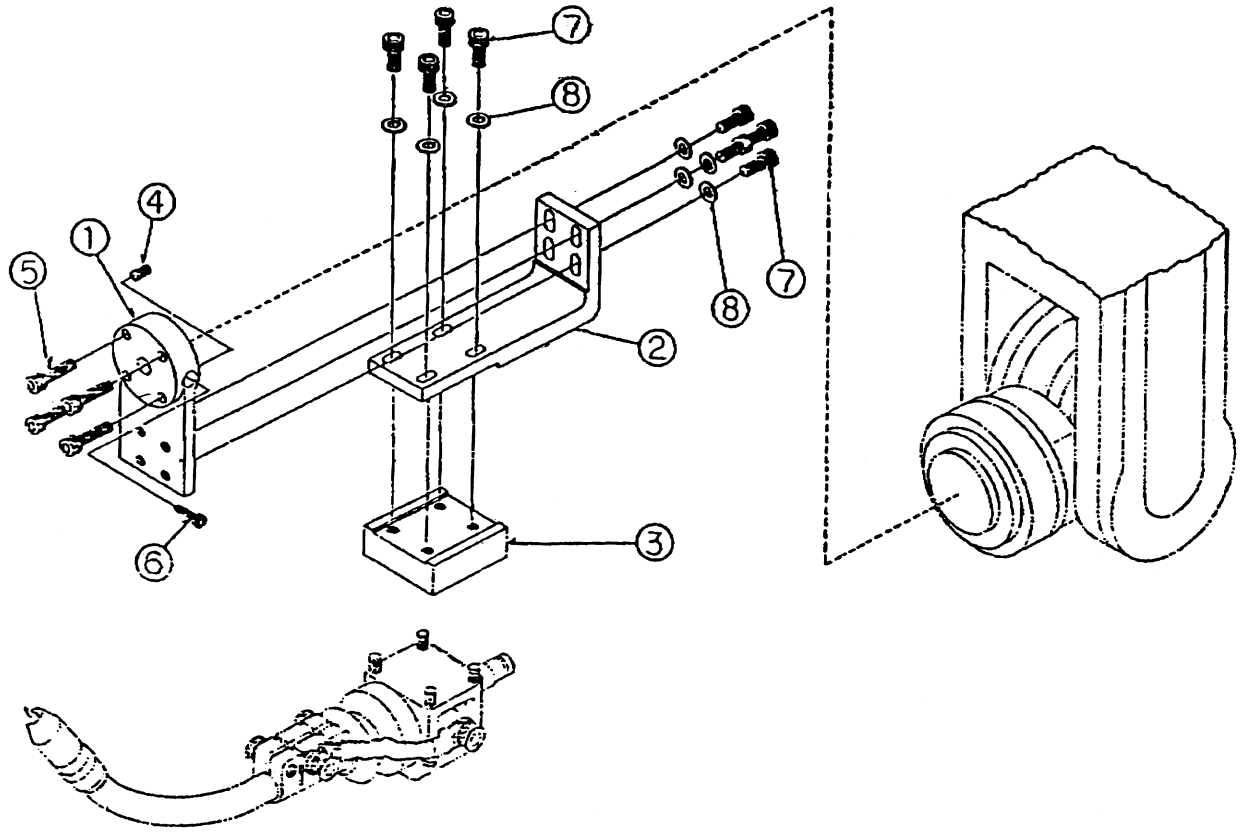


Figure 5-3 Torch Mtg Assembly (Style 1)

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

Item No.	Part No.	Description	Quantity

Figure 5-4 Torch Mtg Assembly (Style 2)

1	184 430	TORCH MOUNT, insulation bracket	1
	136 047	HEX SOCKET SET SCREW, M5 x 10	6
2	184 429	TORCH MOUNT, slide bracket	1
3	184 427	TORCH MOUNT, robot bracket	1
4	160 728	BOLT HEX, skthd M6 x 12	2
5	184 428	TORCH MOUNT, L bracket	1
6	160 729	BOLT HEX, skthd M8 x 20	4
7	180 433	BOLT, hex skt	2
8	184 431	TORCH MOUNT, I-bar	1
9	184 432	BOLT, hex	4

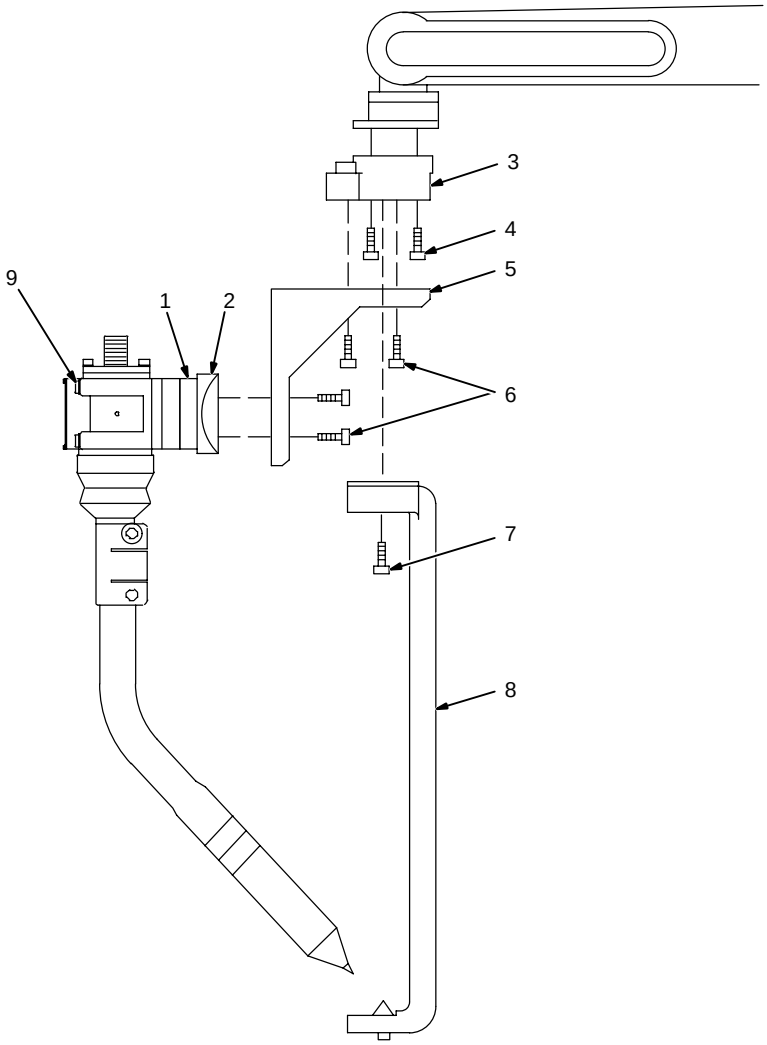


Figure 5-4 Torch Mtg Assembly (Style 2)

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

Notes

Notes

Warranty Questions?

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Service
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Need fast answers to the tough welding questions? Contact your distributor. The expertise of the distributor and Miller is there to help you, every step of the way.

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TRUE BLUE® WARRANTY

Effective January 1, 2000
(Equipment with a serial number preface of "LA" or newer)

This limited warranty supersedes all previous Miller warranties and is exclusive with no other guarantees or warranties expressed or implied.

LIMITED WARRANTY – Subject to the terms and conditions below, Miller Electric Mfg. Co., Appleton, Wisconsin, warrants to its original retail purchaser that new Miller equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped by Miller. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

Within the warranty periods listed below, Miller will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. Miller must be notified in writing within thirty (30) days of such defect or failure, at which time Miller will provide instructions on the warranty claim procedures to be followed.

Miller shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the date that the equipment was delivered to the original retail purchaser, or one year after the equipment is sent to a North American distributor or eighteen months after the equipment is sent to an International distributor.

1. 5 Years Parts – 3 Years Labor
   * Original main power rectifiers
   * Inverters (input and output rectifiers only)
2. 3 Years — Parts and Labor
   * Transformer/Rectifier Power Sources
   * Plasma Arc Cutting Power Sources
   * Semi-Automatic and Automatic Wire Feeders
   * Inverter Power Supplies
   * Intellitig
   * Engine Driven Welding Generators **(NOTE: Engines are warranted separately by the engine manufacturer.)**
3. 1 Year — Parts and Labor
   * DS-2 Wire Feeder
   * Motor Driven Guns (w/exception of Spoolmate 185 & Spoolmate 250)
   * Process Controllers
   * Positioners and Controllers
   * Automatic Motion Devices
   * RFCS Foot Controls
   * Induction Heating Power Sources
   * Water Coolant Systems
   * HF Units
   * Grids
   * Maxstar 140
   * Spot Welders
   * Load Banks
   * Miller Cyclomatic Equipment
   * Running Gear/Trailers
   * Plasma Cutting Torches (except APT & SAF Models)
   * Field Options
     (NOTE: Field options are covered under True Blue® for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
4. 6 Months — Batteries
5. 90 Days — Parts
   * MIG Guns/TIG Torches
   * Induction Heating Coils and Blankets
   * APT, ZIPCUT & PLAZCUT Model Plasma Cutting Torches
   * Remote Controls
   * Accessory Kits
   * Replacement Parts (No labor)
   * Spoolmate 185 & Spoolmate 250
   * Canvas Covers

Miller's True Blue® Limited Warranty shall not apply to:

1. **Consumable components; such as contact tips, cutting nozzles, contactors, brushes, slip rings, relays or parts that fail due to normal wear.**
2. Items furnished by Miller, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer's warranty, if any.
3. Equipment that has been modified by any party other than Miller, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

MILLER PRODUCTS ARE INTENDED FOR PURCHASE AND USE BY COMMERCIAL/INDUSTRIAL USERS AND PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT.

In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at Miller's option: (1) repair; or (2) replacement; or, where authorized in writing by Miller in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized Miller service station; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer's risk and expense. Miller's option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at a Miller authorized service facility as determined by Miller. Therefore no compensation or reimbursement for transportation costs of any kind will be allowed.

TO THE EXTENT PERMITTED BY LAW, THE REMEDIES PROVIDED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL MILLER BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT), WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

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Model Name Serial/Style Number

Purchase Date (Date which equipment was delivered to original customer.)

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City

State Zip

For Service

Call 1-800-4-A-Miller or see our website at www.MillerWelds.com to locate a DISTRIBUTOR or SERVICE AGENCY near you.

Always provide Model Name and Serial/Style Number.

Contact your Distributor for:	Welding Supplies and Consumables
	Options and Accessories
	Personal Safety Equipment
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	Replacement Parts
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	Technical Manuals (Servicing Information and Parts)
	Circuit Diagrams
	Welding Process Handbooks
Contact the Delivering Carrier for:	File a claim for loss or damage during shipment.
For assistance in filing or settling claims, contact your distributor and/or equipment manufacturer's Transportation Department.	

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